

PCTWORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : C07C 29/149, C07D 307/08, 307/32	A3	(11) International Publication Number: WO 99/35113 (43) International Publication Date: 15 July 1999 (15.07.99)
(21) International Application Number: PCT/EP99/00014 (22) International Filing Date: 5 January 1999 (05.01.99) (30) Priority Data: 9800012 8 January 1998 (08.01.98) BE (71) Applicant (for all designated States except US): EURODIOL S.A. [BE/BE]; Parc Industriel Zone A, B-7181 Feluy (BE). (72) Inventor; and (75) Inventor/Applicant (for US only): BERTOLA, Aldo [IT/IT]; Via Luigi Illica, 5, I-20121 Milano (IT). (74) Agent: SARPI, Maurizio; Studio Ferrario, Via Collina, 36, I-00187 Roma (IT).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> (88) Date of publication of the international search report: 16 September 1999 (16.09.99)
(54) Title: A PROCESS FOR THE PRODUCTION OF TETRAHYDROFURAN, GAMMABUTYROLACTONE AND BUTANEDIOL (57) Abstract Process for the production of tetrahydrofuran, gammabutyrolactone and butanediol starting from maleic anhydride esters, consisting of two subsequent hydrogenations.		

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 99/00014

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 C07C29/149 C07D307/08 C07D307/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 C07C C07D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 86 03189 A (DAVY MCKEE (LONDON)) 5 June 1986 see page 5 - page 6; claim 1 ---	1,8
A	US 4 032 458 A (S.D. COOLEY, ET AL.) 28 June 1977 see column 2; claim 1 ---	1,8
A	EP 0 190 424 A (CHEMIE LINZ) 13 August 1986 see example 1 ---	1
A	BE 892 958 A (DAVY MCKEE (OIL & CHEMICALS)) 16 August 1982 see page 6 ---	1,7
	--- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

22 June 1999

Date of mailing of the international search report

01/07/1999

Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.
Fax: (+31-70) 340-3016

Authorized officer

English, R

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 99/00014

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 652 685 A (J.N. CAWSE, ET AL.) 24 March 1987 see column 2 - column 3; examples ---	1,7
A	US 2 251 895 A (W. REPPE, ET AL.) 5 August 1941 see the whole document -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 99/00014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 8603189 A	05-06-1986	BR 8507068 A CA 1249837 A EP 0204730 A JP 6055684 B US 4751334 A JP 62501702 T	14-07-1987 07-02-1989 17-12-1986 27-07-1994 14-06-1988 09-07-1987
US 4032458 A	28-06-1977	NONE	
EP 0190424 A	13-08-1986	DE 3503485 A AT 57523 T CS 8600708 A JP 61180742 A	07-08-1986 15-11-1990 13-10-1989 13-08-1986
BE 892958 A	16-08-1982	AU 560590 B AU 8336582 A BR 8207962 A CA 1229096 A FI 831848 A WO 8203854 A GB 2116552 A,B JP 4057655 B JP 58500993 T NL 191438 B NL 8220121 T SE 452154 B SE 8303027 A ZA 8202718 A	09-04-1987 07-12-1982 04-10-1983 10-11-1987 24-05-1983 11-11-1982 28-09-1983 14-09-1992 23-06-1983 01-03-1995 01-07-1983 16-11-1987 30-05-1983 30-03-1983
US 4652685 A	24-03-1987	EP 0222398 A JP 62155231 A	20-05-1987 10-07-1987
US 2251895 A	05-08-1941	NONE	